Composition of Uterine Fluid of *Viviparus bengalensis* and its Utility for the Brooding Young

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(2 Tables)

THE BANDED POND SNAIL *Viviparus bengalensis* (LAMARCK) is ovoviviparous and broods the young in the uterine brood chamber up to the crawling stage. Embryos of all stages may be obtained from this chamber throughout the year. This chamber is observed to contain a viscous fluid (uterine fluid) in which hatched as well as unhatched embryos are bathed. Moreover, live young ones could be collected in large numbers from the adults kept for aestivation in dry sand for more than three months. Live young ones collected from active adults when kept buried in pure acid-washed sand could not survive for more than 24 hours, while they could survive in water without food for a few days only. Since the young ones could live inside the aestivating adults for more than three months, it is felt that the uterine fluid provides the required moisture and help in the nutrition of the young. With this in view, the constituents of uterine fluid have been estimated (Table 1).

The animal is removed from the shell with the least possible injury, blotted free of moisture, and the brood chamber is punctured. The fluid oozing out of the rather large puncture is collected with a micropipette or syringe, diluted with glass-distilled water to a known volume and used for estimations.

Galactogen was estimated by the Orcinol sulphuric acid reaction, and the level was read from the graph prepared by measuring the corresponding quotient values for the mixed solutions (BRUCKNER, 1953). Glycogen was determined colorimetrically by the method of KEMP *et al.* (1954). Protein content of the fluid was estimated with the folin phenol reagent (LOWRY *et al.*, 1951). Inorganic phosphorus was determined by the method of FISKE & SUBBARAO, 1925, using 1, 2, 4-aminonaphtholsulfonic acid as reducing agent. Sodium, potassium and calcium were estimated by flame photometry using KIPP's H45-392, HOLLAND flame photometer, while magnesium was determined colorimetrically as magnesium-Erichrome black T soluble complex (SMITH, 1955). Lipid in chloroform-ethanol extracts of the fluid and total solids in the fluid were determined gravimetrically.

Galactogen, which is known to be a staple reserve food (WILBUR, 1966) for developing molluscan embryos, is found to be the major uterine constituent. Besides this, the uterine fluid seems to be rich in glycogen and protein. The fat content is low. Evidently the young snails in the brood chamber must be thriving on galactogen, glycogen, and protein. Of the other constituents (Table 1) estimated sodium and calcium are in appreciable quantities, while

Table 1

Composition of Uterine Fluid (mg/ml)

S.No.:	pH	Total Solids	Protein	Fats	Glycogen	Galactogen	Calcium	Inorganic Phosphorous	Sodium	Potassium	Magnesium
Mean	8.7	287.27	15.25	0.0127	2.633	25.10	0.445	0.0030	0.860	0.190	0.013
S. D.	–	±4.479	±0.0322	±0.00083	±0.0058	±2.05	±0.00055	±0.00006	±0.00081	±0.0000024	±0.0000458

magnesium and inorganic phosphorus are not. This may be due to the important role calcium and sodium may play in maturation, cleavage, and gastrulation and the maintenance of the colloidal structure of the egg cortex (Raven, 1958).

It is observed that on aestivation the quantity of the fluid and its total solids decrease considerably with time

Table 2

Total Solids (mg/ml)

State	Mean	S. D.
Active Life	287.27	± 4.479
Aestivation Period	213.00	±17.600

(Table 2) and the embryos are found sticking closely together in the uterine brood chamber, suggesting the possibility of the utilization of uterine fluid during aestivation. It is further observed that no unhatched embryo could be recovered from the uterine chamber of 50 animals kept under aestivation for three months. All these studies indicate that embryos develop, hatch and grow at the expense of uterine fluid, even inside the aestivating adults. The pH of the uterine fluid (Table 1) at 8.7 seems to favour such development and growth of the young.

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